Amendments to the Claims:

Please amend the claims as indicated below, with insertions indicated by underlining and deletions by strike-through.

1-38. (canceled)

39. (currently amended) A method of culturing cells in a reaction system comprising a container for dialysis fluid, ~~a membrane module and~~ a culture vessel for culturing cells, and a membrane module, the membrane module comprising at least one tube-shaped dialysis membrane, the method comprising:

~~using the membrane module in fluid communication with the container and the culture vessel for culturing cells, the module including at least a dialysis fluid space and a culture fluid space separated by a membrane, the membrane functioning as a dialysis membrane;~~

circulating a dialysis fluid through the container and the ~~dialysis fluid space of the~~ membrane module outside of the at least one tube-shaped dialysis membrane;

circulating a culture fluid containing cells through the culture vessel and ~~the~~ inside the at least one tube-shaped dialysis membrane in the ~~culture fluid space of the~~ membrane module wherein the dialysis membrane separates the culture fluid from the dialysis fluid in the membrane module;

introducing a first gas into the culture fluid in the culture vessel; and

introducing a second gas into the culture fluid within the at least one tube-shaped dialysis membrane~~in the culture fluid space in the membrane module~~.

40. (currently amended) The method of claim 39, wherein the second gas is introduced into the culture fluid within the at least one tube-shaped dialysis membrane by one or more tubes connected to the inside of the at least one tube-shaped dialysis membrane~~wherein introducing the second gas includes passing gas directly in the culture fluid present in the membrane module~~.

41. (currently amended) The method of claim 39, wherein the second gas is introduced into the culture fluid within the at least one tube-shaped dialysis membrane by diffusion across the dialysis membrane from the dialysis fluid outside the tube-shaped dialysis membrane~~wherein~~

~~introducing the second gas includes passing gas indirectly into the culture fluid present in the membrane module~~.

42. (currently amended) The method of claim 41, wherein the second gas is introduced ~~wherein passing gas indirectly includes introducing the second gas~~ into the dialysis fluid in the container for the dialysis fluid~~, wherein the gas passes to the culture fluid present in the membrane module via the membrane of the membrane module~~.

43. (currently amended) The method of claim 40, further comprising introducing the second gas into the culture fluid within the at least one tube-shaped dialysis membrane by diffusion across the dialysis membrane from the dialysis fluid outside the tube-shaped dialysis membrane ~~wherein gas is introduced both directly and indirectly at the same time~~.

44. (currently amended) The method of claim 39, wherein the tube-shaped dialysis membrane has a diameter of 6 to 8 millimeters~~claim 41, wherein gas is introduced both directly and indirectly at the same time~~.

45. (currently amended) The method of claim 39, wherein the tube-shaped dialysis membrane has a diameter of 3 to 10 millimeters~~including using a membrane module that includes at least one gas supplying means and further comprising directly introducing the second gas into the dialysis fluid space or the culture fluid space or both via the gas supplying means~~.

46-47. (canceled)

48. (currently amended) The method of claim 40~~45~~, wherein ~~supplying~~ the second gas ~~includes supplying the gas~~ is introduced into the culture fluid through a nozzle outlet attached to an end of the tube.

49. (currently amended) The method of claim 39, ~~including using a~~ wherein the dialysis membrane comprise~~sing~~ a material selected from the group consisting of ~~comprising~~ regenerated cellulose, polyamide, polypropylene and polysulfone.

50-51. (canceled)

52. (previously presented) The method of claim 39, wherein the membrane is formed of Cuprophan.

53-54. (canceled)

55. (currently amended) The method of claim 39, wherein the ~~54, wherein selecting a membrane module that provides sufficient gas exchange includes selecting~~ a membrane module has~~having~~ an area/surface ratio of at least about 5 m^2 per liter.

56. (currently amended) The method of claim 39, wherein the ~~55, wherein selecting a membrane module that provides sufficient gas exchange includes selecting~~ a membrane module has~~having~~ an area/surface ratio of at least about 10 m^2 per liter.

57. (currently amended) The method of claim 39, wherein the ~~56, wherein selecting a membrane module that provides sufficient gas exchange includes selecting~~ a membrane module has~~having~~ an area/surface ratio of at least about 13 m^2 per liter.

58. (currently amended) The method of claim 39, wherein the ~~54, wherein selecting a membrane module that provides sufficient gas exchange includes selecting~~ a membrane module has~~having~~ an oxygen permeability coefficient equal to or greater than about 0.066 cm per minute.

59. (canceled)

60. (previously presented) The method of claim 39, further comprising increasing the pressure in at least one of the membrane module, the space for culturing the cells, and the container for dialysis fluid.

61. (currently amended) The method of claim 39, wherein ~~supplying~~ the first gas ~~includes individually and independently selecting the first gas~~ is selected from the group consisting of air, oxygen, nitrogen, carbon dioxide and mixtures thereof.

62. (currently amended) The method of claim 3961, wherein ~~supplying~~ the second gas ~~includes individually and independently selecting the second gas~~ is selected from the group consisting of air, oxygen, nitrogen, carbon dioxide and mixtures thereof.

63. (previously presented) The method of claim 62, wherein the second gas is oxygen.

64. (previously presented) The method of claim 62, wherein the second gas is carbon dioxide.

65. (currently amended) The method of claim 39, wherein the cells are selected from the group consisting of ~~comprising~~ microbial cells, fungal cells, animal cells, and plant cells.

66. (previously presented) The method of claim 65, wherein the cells are Esherichia coli cells.

67. (previously presented) The method of claim 39, further comprising sterilizing the reaction system.

68. (previously presented) The method of claim 67, further comprising inoculating the culture vessel with cells to be cultured subsequent to sterilizing the reaction system.

69. (previously presented) The method of claim 39, further comprising harvesting the cells.

70-80. (canceled)

81. (currently amended) A method for culturing cells in a reaction system comprising a container for dialysis fluid, a membrane module and a culture vessel for culturing cells, the module comprising at least two dialysis membranes with a first space in between the two membranes and a second space external to the two membranes as in FIG. 4~~including at least two spaces separated by a membrane, the membrane functioning as a dialysis membrane~~;

circulating a dialysis fluid through the second space of the membrane module~~one of the at least two module spaces~~;

circulating a culture fluid containing cells through the first space of the membrane module~~other of the at least two module spaces~~;

introducing a first gas into the culture fluid in the culture vessel~~space for culturing the cells~~; and

introducing a second gas into the culture fluid in the first space of the membrane module.

82. (currently amended) A reaction system for culturing cells, comprising:

a container for dialysis fluid;

a culture vessel for culturing cells; and

at least one membrane module inserted in between the container and the culture vessel, wherein the membrane module comprises at least two dialysis membranes with a first space for culture fluid in between the two membranes and a second space for dialysis fluid external to the two membranes as in FIG. 4, the membrane module further comprising a gas outlet to supply gas to culture fluid in the first spacespaces separated by a dialysis membrane, wherein a liquid flows through each space, the liquid in one of the at least two spaces being dialysis fluid and the liquid in the other of the at least two spaces being culture fluid, and the membrane module further includes at least one gas supplying means, the gas supplying means having an outlet and being located in one of the spaces.

83. (canceled)

84. (previously presented) The reaction system of claim 82, wherein the container for dialysis fluid contains at least one gas-introducing device.

85. (currently amended) The reaction system of claim 82, wherein the membrane module further comprises a support located in the second spacea membrane of the membrane module has a gas permeability coefficient sufficient to ensure sufficient gas supply during passage of the culture fluid through the membrane module.

86-88. (canceled)

89. (previously presented) The reaction system of claim 82, wherein the membrane module has an area/surface ratio of at least about 5 m^2 per liter.

90. (previously presented) The reaction system of claim 82, wherein the membrane module has an area/surface ratio of at least about 10 m^2 per liter.

91. (previously presented) The reaction system of claim 82, wherein the membrane module has an area/surface ratio of at least about 13 m^2 per liter.

92. (previously presented) The reaction system of claim 82, wherein the membrane module has an oxygen permeability coefficient equal to or greater than about 0.066 cm per minute.